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**REPORT OF THE PAHO SCIENTIFIC GROUP ON  
RESEARCH IN ENDEMIC GOITER**

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**WASHINGTON, D.C.**

PAHO SCIENTIFIC GROUP ON RESEARCH  
IN ENDEMIC GOITER

22-26 April 1963  
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REPORT OF THE PAHO SCIENTIFIC GROUP ON  
RESEARCH IN ENDEMIC GOITER\*

Part I - General Session

The PAHO Scientific Group on Research in Endemic Goiter met at the Instituto Venezolano de Investigaciones Cientificas in Caracas, Venezuela (IVIC), from 22-26 April 1963. The host was Dr. Marcel Roche, Director of IVIC. The general purpose of the meeting was to review the field of endemic goiter, to outline the problems which confront the investigator of this disease, and to plan a research program in several scientific centers in Latin America.

The meeting began with a word of welcome from Dr. Marcel Roche and from the Assistant Minister of Health of Venezuela. Both Dr. Raymond B. Allen and Dr. John J. Kevany of PAHO expressed their satisfaction in the calling of the study group, and their hope that from its deliberations a more concerted attack on endemic goiter might be mounted. Dr. John B. Stanbury then outlined the history and aims of the meeting, alluding to his visit to several laboratories in areas of endemic goiter in Latin America during the past year as consultant to PAHO. He expressed hope that not only would the group consider the health problem of goiter and preventive aspects of this disease, but would endeavor to promote scientific investigation in medical centers in Latin America, using the thyroid and its diseases as a focus of activity.

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\* Prepared for the Second Meeting of the PAHO Advisory Committee on Medical Research, 17-21 June 1963, by the PAHO Consultant in Endemic Goiter, Dr. John B. Stanbury, Massachusetts General Hospital, Boston, Massachusetts.

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The next day and a half was occupied with reports of recent studies on endemic goiter under field conditions in the Congo and in New Guinea. The Belgian studies in the Congo were described by Dr. André Ermans of the Free University of Brussels, and Dr. Christian Beckers of the University of Louvain. These investigators have made three expeditions to the Congo in the past four years and have published results of their extensive studies. Dr. Beckers first described the history of the endemic in the Uele region of the Congo, the distribution of goiter, and the clinical aspects of the enlargement of the thyroid seen in that region, including its frequency and sex and age distribution. He described the high uptake of  $I^{131}$  routinely observed in these subjects and the low PBI and  $I^{127}$  excretions which they exhibit, Dr. Ermans then presented in detail the iodine metabolism of the endemic goitrous gland in the Uele region. He described the functional heterogeneity of some of the thyroids, showing that there appears to be a large pool of sequestered iodine which does not enter into the rapid turnover observed in the smaller intrathyroidal iodide pool. This applies only to some of the glands. It was interesting to note that many of these thyroids had a larger than normal amount of iodine in spite of the prevalent iodide deficiency. He also presented evidence for there being a considerable escape of non-hormonal iodine from these glands and speculated that this might account in part at least for the inefficiency of these glands and their need to grow in size.

Dr. Beckers discussed the nature of the iodinated and non-

iodinated proteins in these abnormal glands. Large amounts of albumin are in these glands, but only a minimal amount of this component appears in the peripheral blood. He also noted the high MIT/DIT ratios in these thyroids. He described their attempts to find any evidence of enzymatic deficiency in the glands which might account for inefficiency in the use of iodine, but in general these studies were not rewarding. The thyroxine-binding proteins and their capacity appeared to be normal on the whole.

Dr. Ermans described the endemic cretins in the Uele region. It became evident that everyone does not mean the same thing when he uses the term "cretin", and the need for precise definition of this term for operational purposes was apparent.

Professor Andries Querido then recounted his presently unpublished recent studies in the mountainous and remote districts of central western New Guinea. The salient findings appeared to be a remarkably high incidence of severe goitrousness, with biochemical but little clinical evidence of hypothyroidism. The excretion of iodine by these subjects is probably the lowest anywhere in the world where adequate studies have been done. The incidence of mental retardation is exceedingly high. Professor Querido and his group found no evidence for genetic causation for the goiter or for a dietary goitrogen. It is their opinion that the endemic is entirely attributable to a most severe deficiency of iodine in the diet. Professor Querido again raised the issue of the definition of cretinism.

The program then turned to a consideration of endemic goiter



in Latin America. Drs. Jorge Maisterrena and Enrique Tovar described the general problem of endemic goiter in Mexico and then focussed on their own studies in small villages within easy driving distance of Mexico City, as compared with their parallel studies on school children in Mexico City. Within the past year they built a field metabolic unit in the town of Tepitlexpa, have conducted a series of balance studies and have made observations on the effects of iodine supplementation. While their data indicate that the endemic is widespread, affecting roughly 95% of school children, and is consistent with an average year-round iodine deficiency, they were surprised to find that, at the time of their study, the patients were in strongly positive iodine balance, presumably attributable to the fact that just at that season foods of exogenous origin were available. Dr. Maisterrena related his findings to other evidence of dietary deficiency, such as vitamin A and riboflavin. He presented a series of observations designed to explore the possibilities of various programs of iodine prophylaxis. While these are preliminary in nature, they indicate that it is difficult indeed to abruptly lower iodide uptake by anything short of periodic medication with milligram quantities of iodine. He has been unable to find any evidence of a dietary goitrogen. He has preliminary information indicating that at low levels of iodine intake there may be an obligatory fecal loss of iodine. Dr. Maisterrena's paper brought sharply into focus for the first time in the conference the need for having more precise measures of the severity of endemic goiter and the need for uniformity in definitions.

The program then turned to endemic goiter in Venezuela. Dr. Marcel Roche first described the various geographical areas where endemic goiter has been found and studied, and where future field studies need to be done. He and his group emphasized the curious finding of a high uptake of radioiodine among the aborigines where there is no evidence of endemic goiter whatsoever. Dr. K. Gaede described his method for concentrating the iodinated components from large amounts of blood. This would appear to be a promising technique for application where there might be a suspicion of abnormal circulating iodinated components. Three of Dr. Gaede's research students presented their recent studies. Dr. M. de Perez-Gimenez outlined her plans for measurements on the incorporation of labeled amino acids into thyroid protein, Dr. D. Mujica, his studies on thyroxine synthesis from labeled precursors, and Dr. F. Rodriguez her project on the metabolism of  $C^{14}$ -labeled thyroxine. It was evident to the participants that these studies hold promise for providing new tools in the study of endemic goiter, particularly of  $C^{14}$ -labeled thyroxine can be made readily available so that this metabolite may be studied independently of iodine metabolism. Another promising method was described by Drs. I. Pozner and E. Pimentel of the University of Caracas. This is a method for separation of the iodinated amino acids of plasma on charcoal.

The studies of the group from Rio de Janeiro were recounted by Dr. L.C. Lobo. First he presented evidence to show that there is no relationship between endemic goiter and Chagas' disease in

the interior of Brazil. He then described the neurological findings from his studies in Rio de Janeiro on endemic cretins brought from Goiana, and emphasized the frequency of neurological deficit in these patients.

It was unfortunate that a participant, Dr. Yaro Gandra, of São Paulo, was unable to attend the meeting. He sent for display to the group two large charts from his studies on iodide repletion in the mildly endemic goiter regions near São Paulo. His findings are very similar to those of Dr. Maisterrena in this regard.

Endemic goiter in Chile, contrary to what has been written in the past, is a serious medical problem. The extent of the disease was described by Dr. José Barzelatto. He made the point that all evidence favors iodine deficiency as the central etiological factor. He dwelt on the problem of diagnosis with modern tools of other forms of thyroid disease in an endemic area, and also discussed the difficulties of therapy of endemic goiter once it has been established.

Dr. Jaime Cortazar of Bogotá recounted the history and magnitude of the problem in Colombia. Large numbers of defective persons with short stature and deafness, and some with goiter are available for study in accessible institutions. The relation of these to endemic cretinism is not known.

Dr. Robert Vought of the NIH then described his studies endeavoring to use  $I^{127}$ /creatinine and  $I^{127}$ /nitrogen ratios in spot samples of urine and feces, respectively, as reliable indices of

total iodine excretion via these routes. Some variability in the creatinine determinations was noted. Agreement with observed excretion was good. Most of the patients studied seemed to be in negative iodine balance.

The final presentation was by Dr. Rodrigo Fierro and his associate, Engineer F. Orbe, on endemic goiter in Ecuador. Dr. Fierro described the intensity of the endemic and the possibilities for studies in accessible villages not far distant from Quito. Here endemic cretinism is often found, and deafmutism is an endemic problem. He described the kind of cretinism prevalent in the endemic area, and indicated that the degree of endemic goiter and cretinism varies widely from one town to another. He emphasized the curious point that endemic goiter is rarely seen above an altitude of 3500 meters. In the discussion it was emphasized that there is a rather remarkable and perhaps unique situation prevailing in Ecuador for the study of endemic cretinism as it relates to endemic goiter and other developmental defects, such as deafmutism, which are also prevalent in association with endemic goiter.

At this juncture the group was broken up into five sections to consider specific recommendations. Each was assigned a particular aspect of the endemic goiter problem. Each committee then returned its report, which was discussed in detail. The report was then reformulated, and is submitted herewith as the recommendations of the group as a whole.

PART II

GENERAL PROPOSALS AND RECOMMENDATIONS

A. Recommendations on a Definition of Cretinism

This term cretinism has been used by different workers in different senses, both in endemic goiter areas and as an appellation for certain specific thyroid disease states. The group proposes as follows:

The definition of cretinism can be approached in different ways, for example as a clinical or a pathophysiological entity. Since we do not know through what mechanism the disease is caused, the group has decided to define cretinism in such a way that not only extreme disease states are covered which might occur in endemic goiter areas, but milder forms as well. The group prefers a definition which embraces a wide variety of syndromes seen in an endemic goiter area, and of which the components of the different combinations are:

1. Irreversible changes in mental development.
2. Irreversible abnormalities in hearing and speech, leading to deafmutism at the extreme.
3. Irreversible neuromuscular disorders.
4. Impairment of somatic development.
5. Hypothyroidism.

It should be stressed that this definition should only be applied to individuals born in an endemic goiter area, and that no other causes for the abnormalities can be detected.

The group is of the opinion that the advantages of this definition are:

1. It covers the original description of several workers who have seen the same syndrome in endemic areas.
2. It assigns one word to indicate a serious public health problem in endemic goiter areas.
3. The use of the word "sporadic cretinism" can be defined by indicating that it requires the presence of impaired thyroid function and impairment of somatic and mental development. It, therefore, is a special form of cretinism. The group recommends that the use of the term "sporadic cretinism" should be avoided and substituted by "congenital hypothyroidism".
4. The maintenance of the term "endemic cretinism" in the original sense is advantageous for political reasons with respect to public health measures.

The group recommends that both clinical and experimental studies should be planned to clarify the relation, whatever it may be, between endemic goiter and endemic cretinism.

The discussion which led up to the final proposals of the committee on cretinism was concerned particularly with the problems of whether the definition should include irreversible nervous system damage and impaired intellectual development. It was the consensus that impaired nervous system development is the sine qua non for the diagnosis of cretinism, and that usually there is intellectual

impairment as well, but for purposes of definition this is not absolutely irreversible.

B. Recommendations on Iodine Prophylaxis Programs

The group concluded that the best existing method for the prevention of endemic goiter on a population basis is by means of iodination of common salt. The group recognized, however, that due to certain technical administrative difficulties relative to salt production and distribution, iodination programs have not been effectively applied in many areas of endemic goiter in Latin America, in spite of repeated recommendations to health authorities. Accordingly, it was recommended that research be directed into the following fields:

1. Assessment of the effects of chronic oral administration of varying amounts of iodide and iodate, with parallel studies of iodine balance and metabolism in these patients by means of radioactive or stable iodine uptake and excretion measurements.
2. A study of the possibilities of using iodinated oils, as reported by Clements, Hennessy, and McCullagh, and other iodo compounds, such as those used in the study of the gall bladder. These studies are to be controlled by measurements of the effects on iodine excretion and the activity of the thyroid gland. Periodic administration of the iodized oils, teredax, and similar substances, which establish a long-acting thyro-enteric recycling

system, might well indicate that population-wide administration of such a substance might insure freedom from endemic goiter for several years by a single dose. It was recommended that a study of possible side effects of these substances when administered on a population-wide basis should be observed.

3. Improved field methods should be developed for closer surveillance of the effectiveness of prophylaxis programs, both on goiter, and on the activity of the thyroid gland in the population group.
4. More information should be obtained on the effects of iodide prophylaxis on pre-school children and on pregnant women in order to study better the production of cretinism and its allied disorders and the early stages of the disease.
5. More information is needed regarding the efficiency of utilization of prophylactic iodine under field conditions. The group emphasized the need for standard measures for the estimation of the severity of endemic goiter, and for estimating the amount of iodine ingested and accumulated by the gland as by field balance studies.

In the discussions which led to this set of recommendations, the political problems of iodide prophylaxis were touched on and the group was much encouraged to learn of the interest of the Pan



American Health Organization in promoting a meeting at an early date, for the exploration of the practical implementation of iodine prophylaxis, to be held in Mendoza, Argentina. The group was also concerned lest its recommendations for further studies be interpreted in any way as postponing direct prophylactic action in the field at the present time. Rather, the group was of the opinion that prophylactic programs on nation-wide bases should be accelerated. The obvious need for more physiological studies, for more surveys, and the like, should in no sense be permitted to impede goiter prophylaxis.

C. Recommendations for a Consensus on Epidemiological Field Studies with the Aim for Promoting Uniformity in Data Gathering, Presentation, Collection of Information, and Standardization of Controls.

1. Studies of goiter prevalence should be continued and intensified, and should, when possible, be extended to include observations on adults.
2. Evaluation of the relative risks of those diseases said to be associated with endemic goiter, such as hypo- and hyperthyroidism, thyroid cancer, endemic cretinism, deaf-mutism, pregnancy wastage, etc.
3. Emphasis should be placed on studies of groups of people that offer unique research opportunities because of their homogeneity with respect to one or more of the parameters to be determined in endemic goiter investigations.
4. Estimations of the daily dietary iodine intake and of

urinary and fecal iodine excretion among goitrous and non-goitrous populations.

5. The World Health Organization Goiter Classification should be reappraised in the light of developments since the time of its adoption.

6. Any collaborative research with endemic goiter to be carried out by different groups requires the adoption of reasonably standardized methods in order to make the results obtained comparable with each other. Methods for measuring thyroid radioiodine uptake should be standardized, making use of the offer of the International Atomic Energy Agency to assist in the calibration of methods and instrumentation. Determinations of protein-bound iodine in plasma and of inorganic iodine in urine and feces should be controlled by occasional aliquots measured in a central laboratory.

There was much discussion concerning the WHO classification of goiter. It was finally agreed that the group propose as follows:

Any studies of the endemicity of goiter over the next few years should adopt provisionally a modification of the WHO classification whereby Group Zero is divided into two subgroups: (a) No palpable enlargement, and (b) a palpable, but not visible enlargement.

The reason for this proposed change is that at present WHO Group Zero contains not only normal individuals in the population

group, but also those who have definite but small goiters which are undoubtedly of medical significance and are indicative of the intensity of the endemic, and at present, strongly indicate the need for the institution of prophylactic measures.

D. Recommended Measures for the Ascertainment of the Impact of Endemic Goiter on Population Groups

While the effect of iodine prophylaxis on the incidence of goiter appears to be sufficiently established, the association of goiter itself and the physical and mental defects in the affected community have not been adequately investigated. This appears to be one of the chief reasons why public health measures have often been insufficient. It is held imperative by this group, therefore, that data be collected in an objective way with proper control and with elimination of observer bias in the area of endemic goiter or iodine deficiency or both in goitrous and non-goitrous subjects on psychological and somatic parameters which might be affected, and in particular on:

1. The incidence of direct complications of thyroid dysfunction (thyrotoxicosis and hypothyroidism, with their various complications).
2. Cancer and compression symptoms.
3. Mental and neurological state of the affected community including extreme cases (cretinism, deafness and deaf-mutism, spastic syndromes, strabismus, and mental function in the general community).

4. Somatic growth.

5. Fertility, complications of pregnancy, and pregnancy wastage.

While these are the recommendations of the group it was their opinion that the design of experiments for answering the questions of the impact of endemic goiter would have to be left to the individual investigating groups. The group was well aware of the difficulties involved in answering these questions with precision, particularly in view of the fact that the answers must be based largely on statistical studies in a medical-social system where a large number of variables are encountered.

E. Recommendations for Physiological Studies in the Course of Field Investigations on Endemic Goiter.

1. Initially as complete as possible an inventory of the population group under study should be undertaken. The populations should be listed according to sex and age, distinguishing pre-school age as below 5 years, school age as 5-16 years, and adults from 16 years. Persons should be listed according to type of goiter, whether nodular or diffuse, according to age of appearance of the goiter, if possible, and in accordance with family incidence. In each survey it is important to assess the frequency of cretins and cretinoid subjects and the incidence of myxedema and hyperthyroidism. From this point the studies must progress in accordance with the availability and sophistication of equipment.

2. If the studies are performed with little equipment in primitive places the minimal investigations performed would be (a) uptake of radioiodine, (b) PBI and total iodine, (c) measurements of stable iodine in urine, and (d) nutritional evaluation.
3. Under better technical conditions the following investigations are recommended: (a) perchlorate test and search for goitrogens in food, (b) obtaining of sociological data, such as history, geography and living conditions, (c) estimation of the reflex time.
4. With a further degree of sophistication the studies would include iodine kinetic and balance studies, measurement of  $I^{131}$  uptake, urinary and fecal  $I^{131}$  loss, and  $PBI^{131}$ , as well as  $I^{127}$  in urine and feces. From these data can be derived information relating to iodide intake, balance, route of loss, and estimation of hormone secretion.
5. If more detailed studies are possible, they may include a study of the peripheral hormone constituents and metabolites, as well as study of the regulation of thyroid function by determinations of  $PBI^{131}$  and  $BEI^{131}$ , serum chromatography, resin or red cell  $T_3$  uptake, or thyroid-binding globulin determinations, labeled thyroxine turnover studies with  $I^{131}$  or  $C^{14}$  labeling, detection of antithyroid antibodies, and assay of thyrotropic hormone and other thyroid

stimulating factors in the blood.

6. Finally, if highly specialized biochemical facilities are available, much is to be learned regarding enzymes and proteins of the thyroid gland.

In addition, the group was of the opinion that the following are needed:

1. Genetic studies on cretins and cretinoid subjects.
2. A method for assessing thyroid function independent of iodine metabolism.
3. A more sensitive and reliable technique for assessing goitrogenic activity of foods.
4. Study of the availability of dietary iodide.
5. A comparative study of  $I^{127}$  requirements in children as compared to adults in various conditions, such as pregnancy and in different environments, such as in the tropics, as opposed to temperate or frigid climates.
6. A method for studying thyroid protein synthesis in vivo.
7. Study of the iodine/nitrogen ratio, and the iodine/creatinine ratio in feces and in urine respectively as methods for estimation of total daily loss.
8. Exploration of the possible uses of isotopes of iodine other than  $I^{131}$  in the study of endemic goiter.
9. Noting the discrepancy between FBI values and clinical state as noted by Querido from New Guinea and the Belgian group in the Congo, the group suggested that further studies in apparently hypothyroid subjects

be made with measurement of reflex time as an indication of peripheral hormone need.

10. The group further took note of the vanishing areas where untouched cretinism can be studied and pointed out the necessity for taking maximal advantages of the opportunity to study these patients before the opportunity is lost forever.
11. Further recommendations included the need for more information on the iodine present in food, soil, and water, and on the iodine content of thyroid glands of goitrous subjects from areas of endemic goiter.
12. Finally, the group took note of the fact that remarkable differences exist in the development of goiter among patients evidently exposed to the same degree of iodine deficiency and the same environmental factors insofar as is apparent, and expressed the need for more information which might explain this fact. Among other measures, an inventory of various environmental stresses, particularly sanitational and nutritional, were suggested.

PART III

PRESENT AND PROPOSED INVESTIGATIONS BY PARTICIPATING  
GROUPS

A. Dr. Jorge Maisterrena and Dr. Enrique Tovar, Mexico City:

1. Continued study of stable iodine balance under field conditions. Earlier it was shown that the study patients were in strongly positive iodine balance, evidently due to seasonal influx of exogenous foods. Balance studies must be done at the metabolic unit at Tepitlexpa, and an attempt will also be made to devise methods for doing reasonably reliable metabolic balances in the home environment by taking suitable samples at weekly intervals.
2. The metabolic fate of stable iodine. This will include studies of single doses and doses repeated in varying sizes and at varying time intervals.
3. The fate of labeled iodized oil and labeled iodinated cholegraphic dyes, especially if these can be labeled with  $I^{125}$  for long-term studies. These studies will include measurements of thyroid function, as well as the release rate of iodine from tissue deposits and into the excreta.
4. The fate of iodine when given in a single pulse dose as contrasted with its fate when distributed in the food throughout the day.
5. Further studies on the effects of various dietary compo-



nents on iodide accumulation in a further effort to pinpoint the possibility of specific dietary goitrogenic agents.

6. In areas where goiter appears in more than 90% of the school children, there is an ideal situation for determining the effects of prophylactic iodine in suitably matched groups. This will be done.
7. The relation of goiter to general nutrition, especially protein and vitamin nutrition.

B. Dr. R. Fierro and F. Orbe, Quito, Ecuador:

1. It is the intention of this group to concentrate on a detailed study of endemic cretinism. Initially and in preparation for this a complete inventory of three isolates will be made. These are Tocachi and La Esperanza, where endemic goiter is found in 86% incidence, Gomboya, where the incidence is 82%, and Serena, where the incidence is 19.9%. The inventory will include distribution of goiter and allied defects, such as cretinism, deafmutism, short stature, etc. In addition, family relationships will be recorded.
2. Studies will be made of a certain number of cretins in hospitals in Quito. Observations will include the clinical picture, neurological and electroencephalographic studies, otological studies, and a detailed study of bone structure.  $I^{131}$  uptake and turnover,

serum chromatography, urine chromatography, thyroid triiodothyronine suppression, thyroid blocking with methiamazole, and iodine balance. These observations will extend over long periods of time in order to observe any changes which might result from medication.

3. Observations on pregnancy in the Tocachi region will include measurements of protein-bound iodine throughout pregnancy on a selected group with goiter and early postpartum assessment of thyroid function in the neonate. Included will be measurements of the thyroid-binding protein. This study will extend through the lactation period. If possible, studies of thyroxine degradation will be done by administration to the pregnant patient at various times of minute doses of labeled thyroxine.

C. Dr. José Barzelatto, Santiago, Chile:

The Santiago group has access to a remarkably isolated group of Indians who are accessible from Santiago. The people are genetically quite homogeneous and intermarriage is common. Food supply is almost altogether local.

1. The Santiago group intends to do  $I^{131}$  uptake and turnover studies in the field, together with chromatography of the urine, and  $I^{127}$  excretion studies.  $T_4$  and  $T_3$  degradation rates will be measured.
2. The group will endeavor to study in selected patients the rate at which iodine equilibrium is reached in the

thyroid by employing  $I^{125}$  pulsed tracer studies prior to surgery. The results of this investigation may lead to a better understanding of the problem of iodine balance in the thyroid.

D. Dr. L. C. Lobo, Rio de Janeiro:

1. A small town in the interior of Brazil where endemic goiter is known will be selected for a complete inventory of the population. The data will include birth-place, history of pregnancies, economic status, etc. This study is a joint project with a genetics group from the University of São Paulo.
2. Random blood samples will be taken for assay of blood types and for determination of Chagas' disease for a possible relationship to goitrousness and cretinism.
3. Cretins will be selected for study and compared to normal controls from the same population. Studies will include a complete neurological assessment, including electroencephalography and pneumoencephalography.
4. An intensive study is to be made of the nature of the proteins found in the goitrous thyroids removed at the time of surgery. These specimens are studied at the Biophysical Institute in Rio de Janeiro.
5. Surveys for goiter will be made among the aborigines in the interior of Brazil.

E. Professor Marcel Roche and colleagues, Caracas, Venezuela:

1. The IVIC group intends to continue its surveys of thyroid function among the isolated tribes in Venezuela.
2. The group intends to study in detail the iodine metabolism among a group of these Indians who show the curious anomaly of high iodine uptake without goiter. These studies will include iodine balance and turnover, the nature of the organic compounds in blood and urine, and calculations of the secretion and degradation rates of thyroid hormone.
3. A study of the thyroids of dogs obtained from Indian tribes who present this anomaly in order that quantitative data may be obtained on iodine concentration in the thyroids of animals presumably existing on the same diet as the nongoitrous but iodine-deficient Indians.

F. Dr. Jaime Cortazar, Colombia:

1. To continue spot surveys for the incidence of goiter in Colombia.
2. To study the relation of consanguinity to goiter by statistical assay in various communities.
3. A determination of the stability of iodine in salt by spot surveys in areas where iodinated salt is used. This study will include an effort to find out at what point between producer and consumer iodide is lost.

4. Spot surveys of protein-bound iodine concentration of plasma with reference to endemic goiter. Insofar as possible, additional information will be sought on excretion of iodine, both in urine and in feces in relationship to endemic goiter.
5. Further efforts will be made to examine the impact of endemic goiter in terms of mental deficiency and cancer by statistical survey methods.
6. A study of selected patients from a population group of about 1200 mentally defective patients. These studies to include neurological testing, bone x-rays, thyroid function, etc.

G. Dr. Yaro Gandra, São Paulo:

Professor Gandra was unable to attend the meeting, but his future plans include continued surveys for endemic goiter in São Paulo state, and the interior of Brazil, a study of immunological phenomena in relationship to endemic goiter, especially measurements of antithyroglobulin antibodies and a continued study of the effects of varying doses of iodine in varying administration programs on the incidence of goiter and thyroid function as determined by  $I^{131}$  uptake.

SUMMARY

1. The PAHO Scientific Group on Research in Endemic Goiter consisting of investigators from Brazil, Chile, Colombia, Ecuador, Mexico, The United States and Venezuela, and invited discussants from Belgium, Holland and the International Atomic Energy Agency in Vienna met at IVIC, Caracas, Venezuela, on 22-26 April, 1963.

2. The meeting began with a review of recent and new information on endemic goiter, followed by a survey of contemporary knowledge of the physiology of the thyroid gland and iodine metabolism. The Belgian investigators related their extensive studies on endemic goiter in the Congo, and the Dutch group similarly described its recent studies in New Guinea. Each of the Latin American scientists reviewed the endemic goiter problem in his own country and described his studies recently completed, or now in progress. The program concluded with the formulation of a set of recommendations for further study of endemic goiter and for its prevention.

3. The group was of the opinion that endemic goiter is widespread, and a public health menace, especially in the more severely involved communities, and that opportunities for further investigation at all levels are abundant.

4. The group outlined in some detail the problems which may be profitably attacked now with current techniques and with personnel available presently in endemic goiter regions.

5. The Latin American investigators outlined their present and projected studies in the endemic goiter field. These studies range

from extensive surveys to ascertain the extent and impact of endemic goiter with particular emphasis on its relationship to deafness, pregnancy wastage, general health, and cretinism, to studies related to the techniques of prophylactic programs, to projects which relate to iodine deficiency and goitrogenesis at the molecular level, in terms of abnormal biochemistry of the thyroid.

6. The group stressed the importance of developing uniformity in field surveys, diagnostic criteria, and laboratory measurements. It particularly recommended adoption of the offer of the International Atomic Energy Agency to provide help in this regard with respect to radioiodine measurements, and recommended that spot samples for iodine analysis from the participating groups be controlled by analysis in a central laboratory.

7. Note was taken of the value of the present meeting and it was strongly urged that the participating members reassemble in approximately eighteen months' time for a reassessment of the problems and the progress made, and with the intent of outlining further research at that time.